A Work Project presented as part of the requirements for the Award of a Master's degree in Economics from Nova School of Business and Economics.

DID FOREIGN AID HELP DEVELOPING COUNTRIES RESPONSE TO COVID-19?

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23-November-2020

Abstract

We study if foreign aid received in the past towards Development and towards the Health sector helped developing countries response to COVID-19, using the number of Cases and Deaths of COVID-19 as outcome variables. We find statistically significant evidence that both types of funding have a positive relationship with the number of Cases and Deaths of COVID-19 registered. This result may indicate that countries that receive more funding are also the ones in worse health and development conditions to begin with, and even when receiving higher disbursements, they remain less prepared to fight COVID-19. Because we lack a control for number of tests conducted for COVID-19, another hypothesis is that countries that receive more funding were able to run more tests for COVID-19, resulting in higher records of cases and deaths from the virus.

Keywords: Covid-19, Foreign Aid, Health Funding, Development, Pandemic

Acknowledgements

I want to acknowledge everyone that in anyway helped me during my academic path and a special thanks to Professor Pedro Pita Barros for the supervision of this work and support during the time of its writing. I would like to thank João for all the love, support and understanding, my parents and my sister for the unconditional friendship, advice and guidance and my friends for the endless distractions that kept me sane.

This work used infrastructure and resources funded by Fundação para a Ciência e a Tecnologia (UID/ECO/00124/2013, UID/ECO/00124/2019 and Social Sciences DataLab, Project 22209), POR Lisboa (LISBOA-01-0145-FEDER-007722 and Social Sciences DataLab, Project 22209) and POR Norte (Social Sciences DataLab, Project 22209).

1. Introduction

Pandemics are major drains on a country's economy and life and the COVID-19 pandemic is in no way different. So far, COVID-19 has infected over 43.6 million people in the world and over 28.2 million in underdeveloped countries alone[1].

With talks of new vaccination for the COVID-19 virus, the pandemic will soon be a problem of the past for most developed nations, but it may keep affecting more debilitated countries – with low hand hygiene customs and bad respiratory etiquette along with poor health conditions – for a lot more time, adding to the burden caused by other major epidemics, as is the case of HIV and Ebola.

To try to stop the spread of COVID-19, developed economies have adopted internal measures focusing firstly on the pressure of COVID-19 on their own health care systems before turning to the billions of people in developing nations, that are getting less support than they would if this was an emergency affecting exclusively the developing world, broadening the gap between the third world and the developed nations.

The goal of the analysis is to study if the past disbursement of Development funding and Health specific funding has had an impact on countries' response to COVID-19, specifically if it has an impact on the number of Cases and Deaths from COVID-19 reported in countries on the International Monetary Fund (IMF) Emerging Markets and Developing Economies list.

We use OECD datasets to collect data on Development and Health funding. Development funding per capita is the total sum of disbursements received as Official Development Assistance (ODA), Other Official Flows (OOF) or other monetary aid provided towards development from

[1] Between the 1st of January until the 27th of October. Numbers taken from the EU Open Data Portal, considering a country as underdeveloped if it is included in the FMI's Emerging Markets and Developing Economies list.

2009 to 2018, in Millions USD, divided by each country's total population[2]. Heath funding per capita is the sum of international payments made towards strengthen the health sector of each country from 2009 until 2010, in Millions of USD, divided by the total population of each country.

The mechanism through which we expect Development and Health funding to have an impact in lowering the number of people infected with COVID-19, and the number of people that die with the virus, is by better preparing health systems to receive patients with COVID-19. Mainly by allowing for better health infrastructures, as ventilators, hospital beds and qualified health workers, but also by allowing the population to have access to running potable water, suitable sanitation, and respiratory masks. It is expected that this mechanism is more effective in lowering the number of deaths than cases from COVID-19, since the number of cases of COVID-19 is more dependent on day to day behavior than on the quality of each country's health system.

The results found show that although funding towards the Health sector from 2009 to 2010 has no statistically significant power to explain the number of COVID-19 Deaths per capita registered, the disbursements made towards Development from 2009 to 2018 have consistently statistically significant positive coefficients. To put in words, the data shows that countries that have received one Million USD of additional Development funding per capita from 2009 until 2018 have registered higher number of deaths from COVID-19 per capita, ranging from 0.00062 to 0.00158, on average, *ceteris paribus*, giving signs of lower resilience towards the COVID-19 pandemic.

For the results of the impact on number of Cases from COVID-19 per capita, both Development and Health specific funding show statistically significant positive coefficients, again

[2] Data from the World Bank.

displaying that higher disbursements made towards Development and the Health sector result in higher records of Cases from COVID-19 per capita.

2. Literature Review

The research question proposed falls in three different categories: effects of foreign aid towards development, impact of foreign aid disbursed towards the health sector and COVID-19 influence on the developing world.

The study of the effects of foreign aid is wide-ranging. From its role on economic growth and on reconstruction of countries in post-war periods, to its impact on the promotion of political and social stability and on overall health, various research is available where two different hypotheses are in question. On one side, authors believe that foreign aid has the power to promote development and economic growth – Burnside, Craig, and Dollar (2000) use a World Bank dataset to show that aid influences growth of income when conditioned on good policies, and that this impact is stronger on government consumption than on economic growth. Rajan and Subramanian (2008) show no evidence that aid is more effective with good policies but report a small positive relationship between aid inflows and economic growth. On the other side, some researchers argue that foreign aid not only does not increase development but also demotes upcoming economic, democratic and development growth, much like a natural resource curse, a foreign aid curse is proposed – Subrahmanian (1973), Harford and Klein (2005) and Djankov, Montalvo and Reynal-Querol (2008) all contribute to the literature on this argument.

These two different hypotheses also apply when talking about the impact of health specific funding, with different research achieving different outcomes. Williamson (2008), for example, showed that foreign aid disbursed specifically towards the health sector is unsuccessful in promoting both economic and human development and does not show significant evidence of

raising general health. Gyimah-Brempong (2015) reveals the opposite, aid disbursed specific towards the health sector has a statistically significant positive result on health expenditures in Africa and is successful in increasing overall health in the continent.

Specifically on the effects of foreign aid in increasing developing countries' response to pandemics, Kavanagh et al. (2019) study the effects of US foreign policy on ending epidemics, such as HIV, Malaria and Tuberculosis and find that there is statistically significant evidence that U.S. political and financial help "could help reduce the pandemics […], while preventing tomorrow's outbreaks from becoming global health emergencies" (Kavanagh et al. 2019, 51). Oppenheim and Yamey (2017) also suggest that increasing financial disbursements towards public healthcare systems to Low- and Middle-Income Countries (LMIC) could increase these countries' preparedness to face pandemics.

Although the study of the effects of development and health specific funding is extensive, as described above, research on the effects of COVID-19, and especially its effects on developing countries is still quite virgin. Miller (2020) takes a sample of West African countries to describe the lessons learned from Ebola that can be used to fight COVID-19, writing that "structural healthcare deficiencies […] and limited testing infrastructure and supplies, as well as the potential need to isolate large segments of the population in a region that is so heavily reliant on informal economic and social structures" are one of the biggest challenges for these countries.

The IMF's Finance and Development issue of June 2020 focuses on Policies, Politics and Pandemics. Here, Sayeh and Chami (2020) raise awareness towards the negative income shock in developing countries during the COVID-19 pandemic, caused by a decrease in remittances, that amplify the negative economic shock already in place due to Coronavirus constrains. This negative income shock in remittances might lead to a rise in migrants returning to their home countries, which in turn may escalate the spread of the virus in the future.

On a final note, Alwazir (2020) writes for the United Nation's Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States, affirming that the COVID-19 pandemic has the power to devastate under developed countries, "critically dependent on imported medical and pharmaceutical products" that are even more vulnerable than others since they face not only a major health crisis – with increasing numbers of cases and deaths from COVID-19 –, but a great economic and financial crisis as commodity prices decrease due to Coronavirus restrictions across the world.

Looking at our main hypothesis, the literature available highlights the importance of conducting more research on the impacts of foreign aid in controlling pandemics. With different hypothesis on the table we are left uncertain of the behavior that Development and Health specific funding have in improving countries resilience to COVID-19.

3. Data

We use data on the number of Deaths and Cases from COVID-19 reported by the EU Open Data Portal, aggregated in weekly intervals, for the period between the 1st of January 2020 until the 27th of October 2020, for a total of 43 even weeks. We compare this dataset with the data reported by the University of Oxford, which showed a correlation of 0.91 on Cases from COVID-19 and 0.68 for the data on Deaths from COVID-19. We divide both Cases and Deaths from COVID-19 by the total population to generate outcome variables per capita that take into consideration the size of the country when measuring the impact of COVID-19.

To the EU Open Data Portal dataset, we add the variables Statistical Anomaly Cases and Statistical Anomaly Deaths that take the value of 1 when a week shows a total negative value for either number of cases or deaths, respectively, and 0 otherwise. The negative values of cases and

deaths from COVID-19 in the dataset reflect revisions made *a posteriori* to the data. These variables are then used to check if these statistical anomalies have an impact on the results found.

For the variables of interest, Development Funding per capita and Health Funding per capita, we use data from the OECD dataset to get, respectively, the sum of overall disbursements to each country in analysis from 2009 to 2018, divided by the total population of each country; and the sum of international payments made towards the health sector of each country from 2009 until 2010, in Millions of USD, divided by each county's total population. We use Development and Health Funding per capita to reflect the relevance of Funding in the needs of the country, proxied by population.

It is to be noted that the time frame used for the disbursements of Health specific funding is of only two years (2009 and 2010) due to the low amount of data available. Contrary to what is found with Development funding, where the variable shows the cumulative of various years, the data on Health specific funding is short and so, fails to reflect differences that might have occurred in the disbursement of Health funding through the years in different countries.

As control variables we use data on life expectancy at birth from the World Health Organization (WHO) as a proxy for the health system quality in each country, and data obtained from the Oxford COVID-19 Government Response Tracker (OxCGRT) on the social restrictions applied to each country's population to prevent the spread of COVID-19. From the latter, we use data on the maximum restriction level applied each week in our analysis for schools closing, workplace closing and stay at home requirements (ranging from 0 – no measures – to a maximum of 3), cancelation of public events, restrictions on international movements, closing of public transportation and record of public information campaigns on COVID-19 awareness (reaching from 0 – no measures applied – to a maximum of 2) and restrictions on gatherings and international travel controls (going from 0 to a maximum of 4).

On top of the control variables already mentioned we try to add the percentage of elderly population to control for the higher vulnerability from COVID-19 on older demographic groups, but this variable was too correlated with the Life Expectancy at Birth (0.91), our proxy for Health system quality, to show true results.

We focus the analysis to developing countries in the IMF Emerging Markets and Developing Economies list, which counts a total of 146 countries[3].

Basing our choice for the determinants of aid in the results found in Alesina and Dollar (2000) we build a dataset for Years as a Dependent Territory from 1900 to 2000, with records from the Central Intelligence Agency, the Our World in Data and the UN list of Non self-governing territories as a proxy for years as a colony. We also use a Trade Openness Index that shows the ratio of exports and imports to GDP in 2007, the Size of the Country (Total Population), the GDP per capita in 2007 – as a proxy for poverty –, a measure of Political Regime in 2014 that goes from -10 (full autocracy) to 10 (full democracy), measures for the Rule of Law in 2007, Political Stability in 2008, Government Effectiveness in 2008 and Corruption score in 2008 (all ranging from -2.5 to 2.5) and a Human Rights score for 2007 as explanatory variables for the disbursements of Development Funding from 2009 to 2018 and the Health Funding received from 2009 to 2010.

The correlation of Development funding per capita and Health funding per capita with the variables described above is shown in Tables 7 and 8, respectively.

Focusing first on Table 7, for the correlations with Development funding per capita, there are strong positive relationships with Human Rights score (0.54), Trade openness Index (0.44), Rule of Law (0.43), Corruption score (0.43), Government Effectiveness (0.38), Political Stability (0.36), Political Regime (0.32) and with GDP per capita (0.22). These results suggest that, as found

[3] We considered using the UN's list of Least Developed Countries as the focus of our analysis, but this is a rather restrictive group that would reduce the scope of our results.

in Alesina and Dollar (2000), "foreign aid flows respond to political variables". Richer more developed countries – where the Government is more effective and stable, human rights are followed and the economy is more open – receive higher Development funding per capita.

Total Population has a negative relationship with the total disbursement of Development funding per capita from 2009 to 2018 (-0.19) showing that bigger countries receive less per capita.

Contrasting to the results found in Alesina and Dollar (2000), our proxy for colonial past – Years as a Dependent Territory in the 20th century – shows no statistically significant relationship with the total Development funding received per capita between 2009 and 2018 (-0.02).

Turning to Table 8, for the correlations with Health funding per capita, the results indicate that the strongest relationship is with the Years as a Dependent Territory in the 20th century (0.31), going along with the results found in Alesina and Dollar (2000) for the impact of colonial past in the disbursement of foreign aid. Likewise, most political variables show – as they did for Development Funding per capita – a strong positive relationship with Health funding per capita, as is the case of Human Rights score (0.30), Political Stability (0.26), the control for Corruption (0.24), Trade Openness index (0.18) and Rule of Law (0.11). Indicating, once again, that countries that are more politically stable, more democratic and for which the economy is more open, receive more Health funding per capita. In contrast with the results from Table 7, the Government Effectiveness score has no statistically significant relationship with the disbursement of Health specific aid from 2009 to 2010 (0.01).

There is a strong negative relationship of Health Funding per capita with Total Population (-0.16), larger countries also receive less in Health specific funding per capita, and with GDP per capita (-0.15). The latter suggesting that richer countries receive less Health specific funding per capita, perhaps because they can make higher internal investments towards the Health sector, reducing their need for support from the international community.

The correlations described above are extremely similar to the ones found when we include only countries that are on the IMF's Emerging Markets and Developing Economies list, as seen in Tables 9 and 10, for the correlations with Development funding per capita and health Funding per capita, respectively.

4. Methodology

We start with an OLS regression to model the impact of Development and Health funding on the number of Cases and Deaths from COVID-19, using different outcome variables such as the Weekly total number of Cases and Deaths from COVID-19, the Number of Cases and Deaths per capita on the first wave of COVID-19 in each country – determined by the period from the first case of COVID-19 until the second week in a row of negative growth of cases from COVID-19 in each country – and the Average growth of COVID-19 cases and deaths.

As control variables we use two cross terms to measure the evolution of the Pandemic – represented by the added Development funding received by each country from 2009 to 2018 times the week number in analysis, and the added Health funding received in 2009 and 2010 times the week number in our analysis –, a measure of the Health System quality – Life Expectancy at Birth –, and the maximum weekly restriction level applied to schools closing, workplaces closing, cancelations of public events, restrictions applied on gatherings, closing of public transportations, stay at home requirements, restrictions on international move, international travel controls and public information campaigns on COVID-19 awareness.

The results found in the OLS analysis are compromised due to endogeneity from simultaneity in the model: Countries that receive more Development funding and Health specific funding are in most cases poorer, least developed countries. On one hand, populations in the developing world "often live in crowded, multigenerational households", where it lacks "ready

access to running water" and "adequate sanitation". On the other hand, there are less opportunities to apply restrictions to avoid the spread of the viruses, like working from home or schools closing, due to "poor or no internet connection […] at home"[4].

Hence, countries that receive more Development funding and Health specific funding are also the ones more vulnerable to the spread of COVID-19. The variables of interest and the outcome variables are jointly determined influencing each other at the same time. Endogeneity is also proven with a Durbin test and a Wu-Hausman test for Endogeneity, consistently rejecting the null hypothesis that all variables are exogenous.

To solve the endogeneity problem, we take the results found in Alesina and Dollar (2000) for the pattern of allocation of foreign aid, to run a Second Stage Least Square (2SLS) analysis.

In the first stage of our model we use cross section analysis on political and economic variables – Total population, Trade Openness index, GDP per capita, measures of Rule of Law, Political Stability, Government Effectiveness, Corruption and Human Rights score – along with the number of years as a dependent state from 1900 to 2000 (as a proxy for the colonial past of the country) to justify the amount of Development funding per capita and Health funding per capita received by each country. These variables are uncorrelated with the number of COVID-19 cases and deaths but highly correlated with the allocation of foreign aid, as described in section 3.

We do not include, in the determinants of aid, the variable for Years as a non-dependent state from 1900 to 2000, when explaining the overall Development funding per capita received from 2009 to 2018, and the Government Effectiveness index, when determining the total Health specific funding per capita from 2009 to 2010, since these variables are not statistically significantly correlated with the disbursement of funding, as stated in the previous section.

[4] From the Commentary on COVID-19 Challenges in Developing Countries by Mathew E Levison, MD, Adjunct Professor of Medicine, Drexel University College of Medicine

In the second stage equation we use only control variables specific to the spread of Coronavirus and to control for the natural evolution of the pandemic – restrictions applied to avoid the spread of the viruses, week of analysis to control for the natural evolution of the pandemic and a proxy for the health system quality.

We limit our sample exclusively to countries on the IMF's list of Emerging Markets and Developing Economies (as a representation of the underdeveloped world) and opening the sample to all countries in the world for which there were records on the COVID-19 EU Open Data Portal dataset; by jointly determining Development Funding and Health Funding in the first stage equation and by analyzing the impact on COVID-19 cases and deaths of each type of funding individually – either towards Development or Health. The results are described in the following section.

5. Results

We start with several regressions using Deaths per capita as the outcome variable. The full results are described in Tables 1 to 3 in the Appendix. Table 11, bellow, shows the results of these analysis for the variables of interest only. Columns 1 and 2 present the results when determining Development funding and Heath specific funding together on the first stage, for all countries in the world for which there was data on COVID-19 deaths and cases in the EU Open Data Portal dataset (column 1) and when only including countries that are on the IMF Emerging Markets and Developing Economies list in the analysis (column 2). Columns 3 and 4 show the results when determining Development funding alone on the first stage. Again, for all countries in the world for which there was data on COVID-19 deaths and cases in the EU Open Data Portal dataset (column 3) and by only including countries that are on the IMF Emerging Markets and Developing Economies list in the analysis (column 4). Columns 5 and 6 show the results when determining

Health funding alone in the first stage equation, for all countries in the EU Open Data Portal dataset (column 5) and only for countries in the IMF Emerging Markets and Developing Economies list (column 6).

The results of these analysis show that although Health specific funding received from 2009 to 2010 has no statistically significant power to explain changes in the number of Deaths per capita from COVID-19, funding received towards Development is always statistically significant either at the 5% significance level (when Development and Health funding are determined together in the first phase) or at the 10% significance level (when Development funding is determined alone in the first phase).

Table 11. 2SLS estimation: Dependent variable: Deaths from COVID-19 per capita from 1st of January until 27th of October 2020.

	Deaths per capita					
	(1)	(2)	(3)	(4)	(5)	(6)
	All Countries	IMF Emerging Markets and Developing Economies	All Countries	IMF Emerging Markets and Developing Economies	All Countries	IMF Emerging Markets and Developing Economies
	First stage both Funding	First stage both Funding	First stage Development Funding	First stage Development Funding	First stage Health Funding	First stage Health Funding
Development Funding per capita (2009-2018)	.0015758***	.0011393**	.0006511*	.0006224*		
	(.0005802)	(.0005747)	(.0003677)	(.0003675)		
Health Funding per capita (2009-2010)	-.0259904	-.001651			.0085749	.0191244
	(.0210221)	(.020848)			(.015014)	(.0150281)
Observations	3678	3602	3773	3697	3821	3745
R-squared	.1460325	.1549788	.1510264	.1577045	.151115	.157373

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

The results show that countries that received one million USD more in Development specific funding per capita from 2009 to 2018 had higher registered number of Deaths per capita from COVID-19, ranging anywhere from 0.00062 to 0.00158 on average, *ceteris paribus*. This means that if a country with 10 Million people received 1 million USD more per capita towards Development from 2009 to 2018 it would have registered anywhere from 6,224 to 15,758 more Deaths from COVID-19 for the period of 1st of January until de 27th of October 2020, on average, *ceteris paribus*.

Table 12 shows the results for the variables of interest – Development funding per capita received from 2009 until 2018 and Health funding per capita received from 2009 to 2010 – when using number of Cases per capita from COVID-19 as the outcome variable. Complete results are presented in Tables 4 to 6 in the Appendix.

Like in Table 11, columns 1 and 2 present the results when determining Development funding and Heath specific funding together on the first stage, columns 3 and 4 show the results when determining Development funding alone on the first stage and columns 5 and 6 show the results when determining Health funding alone in the first stage equation, for all countries in the world for which there was data on COVID-19 deaths and cases in the EU Open Data Portal dataset – columns 1, 3 and 5 – and when only including countries that are on the IMF Emerging Markets and Developing Economies list in the analysis – columns 2, 4 and 6.

The results presented in Table 12, show, once again, that Development funding received from 2009 to 2018 has a statistically significant (at the 5% significance level) positive impact on the number of Cases per capita from COVID-19, ranging from 0.079 to 0.107, *ceteris paribus*. Using again the example of a country with 10 Million people, these results show that receiving one Million USD more per capita in Development funding from 2009 to 2018 results in 793,981 to 1,066,287 more cases of COVID-19 registered from the 1st of January until the 27th of October

2020.

Table 12. 2SLS estimation: Dependent variable: Cases from COVID-19 per capita from 1st of January until 27th of October 2020.

Cases per capita

	(1)	(2)	(3)	(4)	(5)	(6)
	All Countries	IMF Emerging Markets and Developing Economies	All Countries	IMF Emerging Markets and Developing Economies	All Countries	IMF Emerging Markets and Developing Economies
	First stage both Funding	First stage both Funding	First stage Development Funding	First stage Development Funding	First stage Health Funding	First stage Health Funding
Development Funding per capita (2009-2018)	.1066287***	.0918926***	.0815058***	.0793981***		
	(.0164025)	(.0161293)	(.0104477)	(.0104189)		
Health Funding per capita (2009-2010)	-1.0891337*	-.3910457			1.3065337***	1.5388425***
	(.5942858)	(.5850838)			(.4349815)	(.4341822)
Observations	3678	3602	3773	3697	3821	3745
R-squared	.2100268	.2284439	.2414437	.24975	.2186429	.227631

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

In terms of Health specific Funding, when determined alone in the first stage equation, we have significant evidence – at the 5% level – that receiving 1 Million USD more per capita in Health funding from 2009 to 2010 increased the number of Cases of COVID-19 registered from the 1st of January until the 27th of October 2020 from 1.307 to 1.539 per capita, on average, *ceteris paribus*. If we imagine a country with 10 Million people, this means that receiving 1 Million USD more per capita increased the number of cases of COVID-19 registered anywhere from 13 Million to 15 Million.

Because the coefficient for Health funding is negative in column 1 – significant at the 10% significance level – together with the higher, positive coefficient for Development funding per

capita, we suspect of possible omitted variable bias, where Health funding is capturing the effect of other omitted variables, in particular, the effect of Development funding. The correlation between the two variables is 0.11.

The results of the analysis are surprising, as it would be expected that countries that receive more funding either towards Development or Health would be able to invest more in important infrastructure to fight COVID-19 – ventilators, higher numbers of health workers, sanitary and hygiene solutions, etc. – that would result in lower number of Deaths and Cases from COVID-19. But the results show exactly the opposite, countries that receive more funding (towards Development and the Health sector) seem to have registered more Cases and Deaths from COVID-19 than others. One hypothesis to explain the negative impacts of Development funding received from 2009 until 2018, and Health funding received from 2009 to 2010 on countries' response to COVID-19 is that countries that receive more funding were able to invest more in infrastructure to test for COVID-19, hence having higher records of detected Deaths and Cases from COVID-19 than other countries that have received less funding, this does not necessarily mean that countries that received higher disbursements of foreign aid have higher real Cases and Deaths from COVID-19, since we do not know the real number of infected people due to lack of testing infrastructure (this is something we cannot control for since there are no datasets available with records of tests conducted for COVID-19 for the entire world). Another hypothesis is that the countries that receive higher disbursements of Development and Health specific funding are also the ones with worse health systems (which our control "Life Expectancy at Birth" fails to fully capture) and least developed, with worst life conditions (we do not include any control for the starting point in terms of development) and so, even when receiving more funding these countries remain behind others in terms of health system quality and development status, performing worse in number of Cases and Deaths from COVID-19.

For the control variables we find statistically significant evidence – at the 1% significance level – that the number of cases and deaths per capita of COVID-19 increased with the number of weeks of analysis, showing the natural evolution of the pandemic. This effect is stronger when the outcome variable used is the number of Cases per capita from COVID-19. That is, although both Cases and Deaths per capita from COVID-19 have increased along the year with the spread of the virus across the globe, the number of cases per capita has had a more pronounced growth than the number of deaths per capita. It is to be noted for further research that since the evolution of COVID-19 was not linear – there were times of intensive growth of the number of Cases and Deaths of COVID-19 followed by periods of low records of number of Cases and Deaths of COVID-19 – this variable would have reflected better the evolution of the pandemic if used in a polynomial of degree 3 or 4.

The coefficient for the variable Life Expectancy at Birth, our control for the health system quality and a proxy for the size of the elderly population in each country, is consistently positive and significant at the 1% level. These results can be interpreted in two ways. On one hand, having a longer life expectancy at birth means having a larger elderly population, which is one of the most at risk population group for COVID-19, resulting in higher number of cases and deaths per capita registered from COVID-19. On the other hand, the results of the analysis might be misleading due to not including a control for the number of tests conducted, so countries that have a better health care system might be able to conduct more tests for COVID-19, hence resulting in a higher number of detected cases of Coronavirus recorded, which can explain the higher coefficients when using Cases of COVID-19 per capita as the outcome variable.

For the control variables on the restrictions applied in each country, Schools closing, Restrictions on gatherings and Closing public transports have consistently significant positive coefficients at the 1% significance level. On one hand, these results may indicate that these restrictions are not only not successful in lowering the number of Cases and Deaths per capita from

COVID-19 but also increase the spread of the virus. On the other hand, these positive relationships may demonstrate an endogeneity problem, since, closing public transports and restrictions on schools closing and on gatherings are only applied when the growth of cases of COVID-19 is very high and they take a while to produce significant effects.

Public information campaigns to raise awareness on the dangers of Coronavirus are consistently successful in decreasing the number of Cases and Deaths of COVID-19 per capita at the 1% significance level, *ceteris paribus*. Our control for Workplaces closing, although negative and statistically significant throughout the analysis (closing work places, and opting to work from home instead, is effective in decreasing the number of cases and deaths per capita of COVID-19) it shows a statistically not significant coefficient when using Cases of COVID-19 per capita as our outcome variable and determining Health specific funding alone in the first stage equation.

On another note, Cancelation of public events, Stay at home requirements and Restrictions on international move are always statistically not significant (at the 5% level) in explaining changes in number of Deaths and Cases of COVID-19 per capita.

The variable International travel controls is also statistically unsignificant when using Cases from COVID-19 per capita as our outcome variable. When using Deaths from COVID-19 per capita as our outcome variable, although the coefficient for International travel controls shows a negative sign when including the entire world in the analysis – statistically significant at the 5% level –, when limiting the sample to countries on the IMF Emerging Markets and Developing Economies list and excluding statistical anomalies from the analysis the coefficient is never statistically significant.

Lastly, from the analysis on the impact of the negative values of Cases and Deaths per capita from COVID-19 in the dataset – that reflect revisions made *a posteriori* to the data – the data shows almost no statistically significant changes in the results found by either excluding or

including these statistical anomalies. The results from this analysis are shown in in columns 2 and 4 of Tables 1 to 6.

6. Conclusion

We use Two Stage Least Squares analysis to understand if the total disbursements of Development funding per capita from 2009 to 2018 (10 years) and Health specific funding from 2009 to 2010 (2 years) per capita helped developing countries response to COVID-19. Specifically, we study if they had an impact in reducing the number of Cases and Deaths from COVID-19 per capita in countries on the IMF Emerging Markets and Developing Economies list.

The results, after adjusting for possible bias that poorer countries are also the ones more vulnerable to the spread and negative impacts of COVID-19, show positive coefficients for both Development funding received from 2009 to 2018 and Health Funding received from 2009 to 2010 on the registered number of Cases and Deaths per capita from COVID-19. That is, receiving more Development or Health funding in the past has hurt countries' response to COVID-19, registering more Cases and Deaths from the virus.

It is important to be noted that the results found in this analysis are dependent on the data available, which by the recency of the events is little and still to be reviewed by scholars. We know that the real number of cases and deaths from COVID-19 around the world is underestimated, especially in rural areas of the underdeveloped world where a lot of cases from COVID-19 are not detected due to absence of appropriate resources. We also know that different countries have different ways of registering Cases and Deaths from COVID-19 for which there is no way to control for. For example, in Portugal until June 2020 if someone died in a car accident but tested positive for COVID-19 it would be officially registered as a death with COVID-19. These temporal and

geographical differences in registering the number of Cases and Deaths from COVID-19 need to be controlled for, using an appropriate dataset which is not yet available.

There is a lot of further research that can be done on the topic of foreign aid's relationship with the spread of COVID-19, but to support additional research, a lot more data needs to be collected on this topic. Namely, extra research could take advantage of data on number of tests conducted for COVID-19 – to control for the fact that richer countries, that are capable of running more tests will also be the ones registering more cases – and a dataset for the quality of laboratory and clinical systems for each country of the world, to control for the fact that different countries have different ways of recording Cases and Deaths from COVID-19.

Further research could also analyze the pressure COVID-19 imposed on Health systems across the world by considering other outcome variables such as deaths from other diseases due to Health System capacity issues. Likewise, additional research could focus on economic outcome variables to measure each country's response to COVID-19, for example the impact of Development funding and Health specific funding on unemployment, famines and GDP growth during COVID-19 and its aftermath.

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Appendix

Appendix A. List of all variables, their definition, source and basic summary statistics.

Variable	Description	Source	Mean	s.d.	Min.	Max.
COVID-19 Cases per capita	Number of weekly Cases of COVID-19 divided by the total population of each country	EU Open Data Portal	0,00022460	0,00056760	-0,00180190	0,00953260
COVID-19 Deaths per capita	Number of weekly Deaths of COVID-19 divided by the total population of each country	EU Open Data Portal	0,00000423	0,00001280	-0,00006830	0,00032490
Development funding per capita	Total sum of disbursements received towards development from 2009 to 2019	OECD	0,00114220	0,00112750	-0,00066750	0,00799360
Health funding per capita	Total sum of disbursements received towards the health sector from 2009 to 2010	OECD	0,00001480	0,00002020	0,00000005	0,00012800
Weeks	Number of the week in analysis from the 1st of January 2020 until the 27th of October 2020 (total of 43 even weeks)	-	22,5	12,26692000	1	43
Life expectancy at birth	Life Expectancy at birth	WHO	71,8	7,71	52,9	84,2
Schools Closing	Maximum weekly restriction level ranging from 0 (no measures) to a maximum of 3	Oxford COVID-19 Response Tracker	1,70662900	1,32357800	0	3
Workplace Closing	Maximum weekly restriction level ranging from 0 (no measures) to a maximum of 3	Oxford COVID-19 Response Tracker	1,26389800	1,11357600	0	3

Stay at home requirements	Maximum weekly restriction level ranging from 0 (no measures) to a maximum of 3	Oxford COVID-19 Response Tracker	0,89839570	0,96235030	0	3
Cancelation of public events	Maximum weekly restriction level ranging from 0 (no measures) to a maximum of 2	Oxford COVID-19 Response Tracker	1,23852800	0,90716500	0	2
Restrictions on international movements	Maximum weekly restriction level ranging from 0 (no measures) to a maximum of 2	Oxford COVID-19 Response Tracker	0,86755380	0,92397210	0	2
Closing public transportations	Maximum weekly restriction level ranging from 0 (no measures) to a maximum of 2	Oxford COVID-19 Response Tracker	0,56361150	0,76925630	0	2
Public information campaigns on COVID-19 awareness	Maximum weekly restriction level ranging from 0 (no measures) to a maximum of 2	Oxford COVID-19 Response Tracker	1,59283700	0,75614790	0	2
Restrictions on gatherings	Maximum weekly restriction level ranging from 0 (no measures) to a maximum of 4	Oxford COVID-19 Response Tracker	2,13170000	1,69838700	0	4
Intenational Travel Controls	Maximum weekly restriction level ranging from 0 (no measures) to a maximum of 4	Oxford COVID-19 Response Tracker	2,47954200	1,50028500	0	4
Years as a dependent territory from 1900 to 2000	Number of years as a dependent, non self-governing territory from 1900 to 2000	CIA World Fact Book, Our World in Data, UN list of Non-self-governin	41,07575000	36,51672000	0	100

		g territories				
Trade Openess Index	Ratio of exports and imports to GDP in 2007	Our World in Data	95,05037000	55,98170000	1,95974300	398,7458
Size of the country	Total Population	World Bank	37800000	142000000	825	1400000000
GDP per capita	Gross Domestic Product divided by total population in 2007	World Bank	16690,23	25060,49	225,86	170534,70
Political Regime	Political Regime in 2014 ranging from -10 (full autocracy) to 10 (full democracy),	Our World in Data	4,19398	6,07933	-10	10
Rule of Law	Measure for the Rule of Law in 2007 ranging from -2.5 to 2.5	World Bank	-0,03994370	1,02613800	-2,40595500	2,01373000
Political Stability	Political Stability in 2008 ranging from -2.5 to 2.5	World Bank	-0,07079120	1,00304200	-2,5	1,51231300
Government Effectiveness	Government Effectiveness in 2008 ranging from -2.5 to 2.5	World Bank	0,01137840	1,00615600	-2,40219500	2,43697500
Corruption	Corruption score in 2008 ranging from -2.5 to 2.5	World Bank	-0,00641590	1,01511400	-1,86871400	2,39306400
Human Rights	Human Rights score for 2007	Our World in Data	0,42243690	1,55907200	-3,07090400	5,07669200

Table 1. Regression results of 2SLS regression analysis with Deaths from COVID-19 per capita as the outcome variable and Development Funding and Health specific Funding determined together in the first stage. The table presents results for all countries in the world for which there was data on COVID-19 deaths and cases in the EU Open Data Portal dataset (1), results for all countries in the world for which there was data on COVID-19 deaths and cases in the EU Open Data Portal dataset excluding from the analysis weeks with negative records of deaths from COVID-19 (2), results for countries in the IMF Emerging Markets and Developing Economies list (3) and results for countries in the IMF Emerging Markets and Developing Economies list excluding from the analysis weeks with negative records of deaths from COVID-19 (4).

Deaths per capita. Development and Health funding determined together in the first stage

	(1)	(2)	(3)	(4)
	All countries	All countries without statistic anomalies	IMF Emerging Markets and Developing Economies	IMF Emerging Markets and Developing Economies without statistic anomalies
Development Funding per capita	.0015758***	.0016377***	.0011393**	.0012081**
	(.0005802)	(.0005745)	(.0005747)	(.0005688)
Health Funding per capita	-.0259904	-.0282817	-.001651	-.0040383
	(.0210221)	(.0208161)	(.020848)	(.020634)
Week	2.000e-07***	2.000e-07***	2.000e-07***	2.000e-07***
	(0)	(0)	(0)	(0)
Schools closing	1.100e-06***	1.100e-06***	1.100e-06***	1.100e-06***
	(2.000e-07)	(2.000e-07)	(2.000e-07)	(2.000e-07)
Workplace closing	-7.000e-07***	-7.000e-07***	-7.000e-07***	-7.000e-07***
	(2.000e-07)	(2.000e-07)	(2.000e-07)	(2.000e-07)
Cancelation public events	4.000e-07	4.000e-07	4.000e-07	4.000e-07
	(4.000e-07)	(3.000e-07)	(4.000e-07)	(4.000e-07)
Restrictions on gatherings	5.000e-07***	6.000e-07***	5.000e-07***	5.000e-07***
	(2.000e-07)	(2.000e-07)	(2.000e-07)	(2.000e-07)
Close public transport	1.400e-06***	1.400e-06***	1.500e-06***	1.500e-06***
	(3.000e-07)	(3.000e-07)	(3.000e-07)	(3.000e-07)
Stay at home requirements	1.000e-07	1.000e-07	-1.000e-07	-1.000e-07
	(2.000e-07)	(2.000e-07)	(2.000e-07)	(2.000e-07)
Restrictions on International move	4.000e-07	4.000e-07	4.000e-07	4.000e-07
	(3.000e-07)	(3.000e-07)	(3.000e-07)	(3.000e-07)
International travel controls	-3.000e-07**	-3.000e-07**	-3.000e-07*	-2.000e-07
	(2.000e-07)	(2.000e-07)	(2.000e-07)	(2.000e-07)
Public Information Campaigns	-2.400e-06***	-2.600e-06***	-2.400e-06***	-2.600e-06***
	(4.000e-07)	(4.000e-07)	(4.000e-07)	(4.000e-07)
Life Expectancy at Birth	3.000e-07***	3.000e-07***	3.000e-07***	3.000e-07***
	(0)	(0)	(0)	(0)
Constant	-.0000217***	-.0000214***	-.0000261***	-.0000258***
	(3.000e-06)	(2.900e-06)	(3.000e-06)	(3.000e-06)
Observations	3678	3677	3602	3601

R-squared	.1460325	.1507923	.1549788	.1604072

Standard errors are in parentheses

**** p<.01, ** p<.05, * p<.1*

Table 2. Regression results of 2SLS regression analysis with Deaths from COVID-19 per capita as the outcome variable and by determining Development Funding alone in the first stage. The table presents results for all countries in the world for which there was data on COVID-19 deaths and cases in the EU Open Data Portal dataset (1), results for all countries in the world for which there was data on COVID-19 deaths and cases in the EU Open Data Portal dataset excluding from the analysis weeks with negative records of deaths from COVID-19 (2), results for countries in the IMF Emerging Markets and Developing Economies list (3) and results for countries in the IMF Emerging Markets and Developing Economies list excluding from the analysis weeks with negative records of deaths from COVID-19 (4).

Deaths per capita. Development funding determined alone in the first stage

	(1)	(2)	(3)	(4)
	All countries	All countries without statistic anomalies	IMF Emerging Markets and Developing Economies	IMF Emerging Markets and Developing Economies without statistic anomalies
Development Funding per capita	.0006511*	.0006538*	.0006224*	.000625*
	(.0003677)	(.000364)	(.0003675)	(.0003638)
Week	2.000e-07***	2.000e-07***	2.000e-07***	2.000e-07***
	(0)	(0)	(0)	(0)
Schools closing	1.100e-06***	1.200e-06***	1.100e-06***	1.100e-06***
	(2.000e-07)	(2.000e-07)	(2.000e-07)	(2.000e-07)
Workplace closing	-6.000e-07***	-6.000e-07***	-6.000e-07***	-7.000e-07***
	(2.000e-07)	(2.000e-07)	(2.000e-07)	(2.000e-07)
Cancelation public events	4.000e-07	4.000e-07	4.000e-07	4.000e-07
	(3.000e-07)	(3.000e-07)	(3.000e-07)	(3.000e-07)
Restrictions on gatherings	5.000e-07***	5.000e-07***	5.000e-07***	5.000e-07***
	(2.000e-07)	(2.000e-07)	(2.000e-07)	(2.000e-07)
Close public transport	1.300e-06***	1.400e-06***	1.400e-06***	1.400e-06***
	(3.000e-07)	(3.000e-07)	(3.000e-07)	(3.000e-07)
Stay at home requirements	-1.000e-07	-1.000e-07	-2.000e-07	-2.000e-07
	(2.000e-07)	(2.000e-07)	(2.000e-07)	(2.000e-07)
Restrictions on International move	3.000e-07	3.000e-07	4.000e-07	4.000e-07*

	(3.000e-07)	(3.000e-07)	(3.000e-07)	(3.000e-07)
International travel controls	-3.000e-07**	-3.000e-07*	-3.000e-07*	-2.000e-07
	(2.000e-07)	(2.000e-07)	(2.000e-07)	(2.000e-07)
Public Information Campaigns	-2.300e-06***	-2.500e-06***	-2.300e-06***	-2.500e-06***
	(4.000e-07)	(4.000e-07)	(4.000e-07)	(4.000e-07)
Life Expectancy at Birth	3.000e-07***	3.000e-07***	3.000e-07***	3.000e-07***
	(0)	(0)	(0)	(0)
Constant	-.0000251***	-.0000251***	-.0000272***	-.0000272***
	(1.900e-06)	(1.900e-06)	(2.000e-06)	(2.000e-06)
Observations	3773	3772	3697	3696
R-squared	.1510264	.1563817	.1577045	.1632882

Standard errors are in parentheses

**** p<.01, ** p<.05, * p<.1*

Table 3. Regression results of 2SLS regression analysis with Deaths from COVID-19 per capita as the outcome variable and by determining Health specific Funding alone in the first stage. The table presents results for all countries in the world for which there was data on COVID-19 deaths and cases in the EU Open Data Portal dataset (1), results for all countries in the world for which there was data on COVID-19 deaths and cases in the EU Open Data Portal dataset excluding from the analysis weeks with negative records of deaths from COVID-19 (2), results for countries in the IMF Emerging Markets and Developing Economies list (3) and results for countries in the IMF Emerging Markets and Developing Economies list excluding from the analysis weeks with negative records of deaths from COVID-19 (4).

Deaths per capita. Development funding determined alone in the first stage

	(1)	(2)	(3)	(4)
	All countries	All countries without statistic anomalies	IMF Emerging Markets and Developing Economies	IMF Emerging Markets and Developing Economies without statistic anomalies
Health Funding per capita	.0085749	.0088196	.0191244	.01945
	(.015014)	(.0148721)	(.0150281)	(.0148837)
Week	2.000e-07***	2.000e-07***	2.000e-07***	2.000e-07***
	(0)	(0)	(0)	(0)
Schools closing	1.100e-06***	1.100e-06***	1.000e-06***	1.100e-06***
	(2.000e-07)	(2.000e-07)	(2.000e-07)	(2.000e-07)

Workplace closing	-4.000e-07*	-4.000e-07**	-5.000e-07**	-5.000e-07**
	(2.000e-07)	(2.000e-07)	(2.000e-07)	(2.000e-07)
Cancelation public events	3.000e-07	3.000e-07	3.000e-07	3.000e-07
	(3.000e-07)	(3.000e-07)	(3.000e-07)	(3.000e-07)
Restrictions on gatherings	5.000e-07***	5.000e-07***	5.000e-07***	5.000e-07***
	(2.000e-07)	(2.000e-07)	(2.000e-07)	(2.000e-07)
Close public transport	1.100e-06***	1.200e-06***	1.200e-06***	1.300e-06***
	(3.000e-07)	(3.000e-07)	(3.000e-07)	(3.000e-07)
Stay at home requirements	4.000e-07	4.000e-07	2.000e-07	2.000e-07
	(2.000e-07)	(2.000e-07)	(2.000e-07)	(2.000e-07)
Restrictions on International move	2.000e-07	2.000e-07	3.000e-07	3.000e-07
	(3.000e-07)	(3.000e-07)	(3.000e-07)	(3.000e-07)
International travel controls	-3.000e-07**	-3.000e-07*	-3.000e-07*	-2.000e-07
	(2.000e-07)	(2.000e-07)	(2.000e-07)	(2.000e-07)
Public Information Campaigns	-2.300e-06***	-2.400e-06***	-2.300e-06***	-2.400e-06***
	(4.000e-07)	(4.000e-07)	(4.000e-07)	(4.000e-07)
Life Expectancy at Birth	4.000e-07***	4.000e-07***	4.000e-07***	4.000e-07***
	(0)	(0)	(0)	(0)
Constant	-.0000278***	-.0000278***	-.0000305***	-.0000305***
	(2.100e-06)	(2.100e-06)	(2.100e-06)	(2.100e-06)
Observations	3821	3820	3745	3744
R-squared	.151115	.1561251	.157373	.1625778

Standard errors are in parentheses

**** p<.01, ** p<.05, * p<.1*

Table 4. Regression results of 2SLS regression analysis with Cases from COVID-19 per capita as the outcome variable and Development Funding and Health specific Funding determined together in the first stage. The table presents results for all countries in the world for which there was data on COVID-19 deaths and cases in the EU Open Data Portal dataset (1), results for all countries in the world for which there was data on COVID-19 deaths and cases in the EU Open Data Portal dataset excluding from the analysis weeks with negative records of cases from COVID-19 (2), results for countries in the IMF Emerging Markets and Developing Economies list (3) and results for countries in the IMF Emerging Markets and Developing Economies list excluding from the analysis weeks with negative records of cases from COVID-19 (4).

Cases per capita. Development and Health funding determined together in the first stage

	(1)	(2)	(3)	(4)

	All countries	All countries without statistic anomalies	IMF Emerging Markets and Developing Economies	IMF Emerging Markets and Developing Economies without statistic anomalies
Development Funding per capita	.1066287***	.1067164***	.0918926***	.0918748***
	(.0164025)	(.0164156)	(.0161293)	(.0161418)
Health Funding per capita	-1.0891337*	-1.0794578*	-.3910457	-.3766016
	(.5942858)	(.5940538)	(.5850838)	(.5848415)
Week	9.700e-06***	9.700e-06***	9.900e-06***	9.900e-06***
	(5.000e-07)	(5.000e-07)	(5.000e-07)	(5.000e-07)
Schools closing	.0000365***	.0000368***	.000035***	.0000353***
	(5.700e-06)	(5.700e-06)	(5.800e-06)	(5.800e-06)
Workplace closing	-.0000232***	-.0000234***	-.0000234***	-.0000237***
	(6.600e-06)	(6.600e-06)	(6.600e-06)	(6.600e-06)
Cancelation public events	.0000155	.000016	.0000161	.0000166*
	(.00001)	(.00001)	(.00001)	(.00001)
Restrictions on gatherings	.0000189***	.0000186***	.0000182***	.0000179***
	(5.000e-06)	(5.000e-06)	(5.100e-06)	(5.100e-06)
Close public transport	.0000347***	.0000348***	.0000374***	.0000375***
	(7.500e-06)	(7.500e-06)	(7.500e-06)	(7.500e-06)
Stay at home requirements	4.000e-07	6.000e-07	-4.900e-06	-4.800e-06
	(6.800e-06)	(6.800e-06)	(6.900e-06)	(6.900e-06)
Restrictions on International move	.0000101	.00001	.0000119	.0000117
	(8.000e-06)	(8.000e-06)	(8.100e-06)	(8.100e-06)
International travel controls	-3.000e-06	-3.200e-06	-5.000e-07	-7.000e-07
	(4.400e-06)	(4.400e-06)	(4.400e-06)	(4.400e-06)
Public Information Campaigns	-.0000938***	-.0000936***	-.0000918***	-.0000916***
	(.0000119)	(.0000119)	(.000012)	(.000012)
Life Expectancy at Birth	8.200e-06***	8.200e-06***	.0000102***	.0000102***
	(1.200e-06)	(1.200e-06)	(1.300e-06)	(1.300e-06)
Constant	-.0007474***	-.0007513***	-.0008869***	-.0008916***
	(.000084)	(.000084)	(.0000851)	(.0000851)
Observations	3678	3673	3602	3597
R-squared	.2100268	.211028	.2284439	.2295208

Standard errors are in parentheses

*** p<.01, ** p<.05, * p<.1

Table 5. Regression results of 2SLS regression analysis with Cases from COVID-19 per capita as the outcome variable and by determining Development Funding alone in the first stage. The table presents results for all countries in the world for which there was data on COVID-19 deaths and cases in the EU Open Data Portal dataset (1), results for all countries in the world for which there was data on COVID-19 deaths and cases in the EU Open Data Portal dataset excluding from the analysis weeks with negative records of cases from COVID-19 (2), results for countries in the IMF Emerging Markets and Developing Economies list (3) and results for countries in the IMF Emerging Markets and Developing Economies list excluding from the analysis weeks with negative records of cases from COVID-19 (4).

Cases per capita. Development funding determined alone in the first stage

	(1)	(2)	(3)	(4)
	All countries	All countries without statistic anomalies	IMF Emerging Markets and Developing Economies	IMF Emerging Markets and Developing Economies without statistic anomalies
Development Funding per capita	.0815058***	.0816737***	.0793981***	.0795584***
	(.0104477)	(.0104541)	(.0104189)	(.0104249)
Week	.0000102***	.0000102***	.0000104***	.0000104***
	(4.000e-07)	(4.000e-07)	(5.000e-07)	(4.000e-07)
Schools closing	.0000377***	.000038***	.0000359***	.0000362***
	(5.700e-06)	(5.700e-06)	(5.800e-06)	(5.800e-06)
Workplace closing	-.000016**	-.0000162***	-.0000183***	-.0000186***
	(6.200e-06)	(6.200e-06)	(6.300e-06)	(6.300e-06)
Cancelation public events	.0000176*	.0000181*	.0000162*	.0000166*
	(9.700e-06)	(9.800e-06)	(9.800e-06)	(9.800e-06)
Restrictions on gatherings	.0000183***	.0000181***	.0000198***	.0000197***
	(4.500e-06)	(4.500e-06)	(4.600e-06)	(4.600e-06)
Close public transport	.0000317***	.0000318***	.0000332***	.0000333***
	(7.200e-06)	(7.300e-06)	(7.300e-06)	(7.300e-06)
Stay at home requirements	-5.600e-06	-5.400e-06	-.0000103	-.0000101
	(6.700e-06)	(6.700e-06)	(6.800e-06)	(6.800e-06)
Restrictions on International move	6.800e-06	6.700e-06	.0000115	.0000115
	(7.400e-06)	(7.400e-06)	(7.500e-06)	(7.500e-06)
International travel controls	-2.900e-06	-3.200e-06	-5.000e-07	-8.000e-07

	(4.300e-06)	(4.300e-06)	(4.400e-06)	(4.400e-06)
Public Information Campaigns	-.0000967***	-.0000965***	-.0000954***	-.0000952***
	(.0000117)	(.0000117)	(.0000119)	(.0000119)
Life Expectancy at Birth	.0000103***	.0000104***	.0000113***	.0000113***
	(8.000e-07)	(8.000e-07)	(8.000e-07)	(8.000e-07)
Constant	-.0008939***	-.0008969***	-.0009646***	-.0009678***
	(.0000547)	(.0000547)	(.0000565)	(.0000566)
Observations	3773	3768	3697	3692
R-squared	.2414437	.2423368	.24975	.2506907

Standard errors are in parentheses

**** p<.01, ** p<.05, * p<.1*

Table 6. Regression results of 2SLS regression analysis with Cases from COVID-19 per capita as the outcome variable and by determining Health specific Funding alone in the first stage. The table presents results for all countries in the world for which there was data on COVID-19 deaths and cases in the EU Open Data Portal dataset (1), results for all countries in the world for which there was data on COVID-19 deaths and cases in the EU Open Data Portal dataset excluding from the analysis weeks with negative records of cases from COVID-19 (2), results for countries in the IMF Emerging Markets and Developing Economies list (3) and results for countries in the IMF Emerging Markets and Developing Economies list excluding from the analysis weeks with negative records of cases from COVID-19 (4).

Cases per capita. Health funding determined alone in the first stage

	(1)	(2)	(3)	(4)
	All countries	All countries without statistic anomalies	IMF Emerging Markets and Developing Economies	IMF Emerging Markets and Developing Economies without statistic anomalies
Health Funding per capita	1.3065337***	1.3099952***	1.5388425***	1.5442118***
	(.4349815)	(.4348426)	(.4341822)	(.4340328)
Week	9.700e-06***	9.800e-06***	9.900e-06***	9.900e-06***
	(5.000e-07)	(5.000e-07)	(5.000e-07)	(5.000e-07)
Schools closing	.0000353***	.0000356***	.0000333***	.0000336***
	(5.900e-06)	(5.900e-06)	(6.000e-06)	(6.000e-06)
Workplace closing	-8.200e-06	-8.300e-06	-.0000105	-.0000107
	(6.500e-06)	(6.500e-06)	(6.600e-06)	(6.600e-06)

Cancelation public events	.0000143	.0000146	.0000137	.000014
	(.00001)	(.00001)	(.0000101)	(.0000101)
Restrictions on gatherings	.0000141***	.000014***	.0000152***	.000015***
	(4.800e-06)	(4.800e-06)	(4.900e-06)	(4.900e-06)
Close public transport	.0000174**	.0000175**	.0000203***	.0000204***
	(7.600e-06)	(7.700e-06)	(7.700e-06)	(7.700e-06)
Stay at home requirements	7.200e-06	7.300e-06	2.100e-06	2.200e-06
	(6.900e-06)	(6.900e-06)	(7.000e-06)	(7.000e-06)
Restrictions on International move	-3.800e-06	-3.800e-06	1.500e-06	1.500e-06
	(7.700e-06)	(7.700e-06)	(7.800e-06)	(7.800e-06)
International travel controls	-1.000e-06	-1.300e-06	1.000e-06	8.000e-07
	(4.400e-06)	(4.400e-06)	(4.500e-06)	(4.500e-06)
Public Information Campaigns	-.0000785***	-.0000784***	-.000078***	-.0000778***
	(.000012)	(.0000119)	(.0000121)	(.0000121)
Life Expectancy at Birth	.000015***	.000015***	.0000162***	.0000162***
	(8.000e-07)	(8.000e-07)	(8.000e-07)	(8.000e-07)
Constant	-.0011635***	-.0011668***	-.0012533***	-.0012569***
	(.00006)	(.0000601)	(.0000606)	(.0000606)
Observations	3821	3816	3745	3740
R-squared	.2186429	.219541	.227631	.2285632

Standard errors are in parentheses

*** p<.01, ** p<.05, * p<.1*

Standard errors are in parentheses

*** p<.01, ** p<.05, * p<.1*

Table 7. Correlations of determinants of aid with total Development Funding per capita.

	Development Funding per capita	Years as a Dependent Territory 1900-2000	Total Population	Trade Openness 2007	GDP per capita 2007	Political Regime 2014	Rule of Law 2007	Political Stability 2008	Gov. Effectiveness 2008	Corruption 2008	Human Rights 2007
Development Funding per capita	1										
Years as a Dependent Territory 1900-2000	-0.0242	1									
Total Population	-0.190***	-0.137***	1								
Trade openness 2007	0.435***	0.141***	-0.190***	1							
GDP per capita 2007	0.220***	-0.274***	-0.0223	0.162***	1						
Political Regime 2014	0.321***	-0.244***	-0.0451**	0.00320	0.0440**	1					
Rule of Law 2007	0.433***	-0.0841***	0.101***	0.136***	0.216***	0.342***	1				
Political Stability 2008	0.362***	0.131***	-0.129***	0.340***	0.286***	0.0484***	0.526***	1			
Gov. Effectiveness 2008	0.381***	-0.220***	0.171***	0.166***	0.332***	0.330***	0.868***	0.397***	1		
Corruption 2008	0.426***	-0.118***	0.0246	0.0923***	0.239***	0.337***	0.860***	0.532***	0.790***	1	
Human Rights 2007	0.537***	0.103***	-0.295***	0.387***	0.0916***	0.308***	0.436***	0.724***	0.279***	0.504***	1

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 8. Correlations of determinants of aid with total Health Funding per capita.

	Health Funding per capita	Years as a Dependent Territory 1900-2000	Total Population	Trade Openness 2007	GDP per capita 2007	Political Regime 2014	Rule of Law 2007	Political Stability 2008	Gov. Effectiveness 2008	Corruption 2008	Human Rights 2007
Health Funding per capita	1										
Years as a Dependent Territory 1900-2000	0.312***	1									
Total Population	-0.158***	-0.130***	1								
Trade Openness 2007	0.181***	0.148***	-0.188***	1							
GDP per capita 2007	-0.148***	-0.230***	-0.0400**	0.141***	1						
Political Regime 2014	0.0711***	-0.258***	-0.0532***	-0.000108	0.164***	1					
Rule of Law 2007	0.114***	-0.146***	0.0825***	0.109***	0.360***	0.371***	1				
Political Stability 2008	0.264***	0.0985***	-0.132***	0.316***	0.321***	0.0860***	0.552***	1			
Gov. Effectiveness 2008	0.00874	-0.241***	0.144***	0.151***	0.472***	0.367***	0.888***	0.451***	1		
Corruption 2008	0.239***	-0.195***	0.00925	0.0590***	0.388***	0.366***	0.873***	0.559***	0.813***	1	
Human Rights 2007	0.302***	0.0582***	-0.291***	0.349***	0.245***	0.342***	0.484***	0.745***	0.356***	0.550***	1

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 9. Correlations of determinants of aid with total Development Funding per capita for countries on the IMF Emerging Markets and Developing Economies list.

	Development Funding per capita	Years as a Dependent Territory 1900-2000	Total Population	Trade Openness 2007	GDP per capita 2007	Political Regime 2014	Rule of Law 2007	Political Stability 2008	Gov. Effectiveness 2008	Corruption 2008	Human Rights 2007
Development Funding per capita	1										
Years as a Dependent Territory 1900-2000	-0.0374*	1									
Total Population	-0.192***	-0.142***	1								
Trade Openness 2007	0.439***	0.148***	-0.197***	1							
GDP per capita 2007	0.226***	-0.265***	-0.0213	0.167***	1						
Political Regime 2014	0.315***	-0.295***	-0.0493***	-0.00381	0.0612***	1					
Rule of Law 2007	0.439***	-0.0721***	0.100***	0.126***	0.213***	0.362***	1				
Political Stability 2008	0.372***	0.140***	-0.128***	0.374***	0.286***	0.0628***	0.542***	1			
Gov. Effectiveness 2008	0.391***	-0.202***	0.173***	0.157***	0.328***	0.361***	0.868***	0.412***	1		
Corruption 2008	0.443***	-0.0942***	0.0282	0.109***	0.232***	0.381***	0.871***	0.528***	0.797***	1	
Human Rights 2007	0.540***	0.0890***	-0.296***	0.413***	0.0977***	0.306***	0.453***	0.726***	0.300***	0.518***	1

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 10. Correlations of determinants of aid with total Health Funding per capita for countries on the IMF Emerging Markets and Developing Economies list.

	Health Funding per capita	Years as a Dependent Territory 1900-2000	Total Population	Trade Openness 2007	GDP per capita 2007	Political Regime 2014	Rule of Law 2007	Political Stability 2008	Gov. Effectiveness 2008	Corruption 2008	Human Rights 2007
Health Funding per capita	1										
Years as a Dependent Territory 1900-2000	0.302***	1									
Total Population	-0.159***	-0.134***	1								
Trade Openness 2007	0.186***	0.155***	-0.194***	1							
GDP per capita 2007	-0.144***	-0.224***	-0.0393**	0.145***	1						
Political Regime 2014	0.0553***	-0.308***	-0.0575***	-0.00679	0.180***	1					
Rule of Law 2007	0.120***	-0.138***	0.0821***	0.0993***	0.360***	0.389***	1				
Political Stability 2008	0.270***	0.106***	-0.130***	0.349***	0.322***	0.101***	0.568***	1			
Gov. Effectiveness 2008	0.0178	-0.228***	0.145***	0.142***	0.471***	0.395***	0.887***	0.466***	1		
Corruption 2008	0.253***	-0.178***	0.0122	0.0731***	0.385***	0.405***	0.883***	0.556***	0.821***	1	
Human Rights 2007	0.298***	0.0432**	-0.292***	0.372***	0.251***	0.339***	0.500***	0.748***	0.375***	0.563***	1

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Appendix B. List of Countries in Analysis and respective Country Code (Alpha 3 Code).

Country	Country Code
Aruba	ABW
Afghanistan	AFG
Angola	AGO
Anguilla	AIA
Albania	ALB
Andorra	AND
Netherlands Antilles	ANT
United Arab Emirates	ARE

Argentina	ARG
Armenia	ARM
Antigua and Barbuda	ATG
Australia	AUS
Austria	AUT
Azerbaijan	AZE
Burundi	BDI
Belgium	BEL
Benin	BEN
Caribbean Netherlands	BES
Burkina Faso	BFA
Bangladesh	BGD
Bulgaria	BGR
Bahrain	BHR
Bahamas	BHS
Bosnia and Herzegovina	BIH
Belarus	BLR
Belize	BLZ
Bermuda	BMU
Bolivia	BOL
Brazil	BRA
Barbados	BRB
Brunei	BRN
Bhutan	BTN
Botswana	BWA
Central African Republic	CAF
Canada	CAN
Switzerland	CHE
Chile	CHL
China	CHN
Cote d'Ivoire	CIV
Cameroon	CMR
Democratic Republic of Congo	COD
Congo	COG
Colombia	COL
Comoros	COM
Cape Verde	CPV
Costa Rica	CRI
Cuba	CUB
Curação	CUW
Cayman Islands	CYM
Cyprus	CYP
Czech Republic	CZE
Germany	DEU
Djibouti	DJI

Dominica	DMA
Denmark	DNK
Dominican Republic	DOM
Algeria	DZA
Ecuador	ECU
Egypt	EGY
Eritrea	ERI
Western Sahara	ESH
Spain	ESP
Estonia	EST
Ethiopia	ETH
Finland	FIN
Fiji	FJI
Falkland Islands	FLK
France	FRA
Faroe Islands	FRO
Gabon	GAB
United Kingdom	GBR
Georgia	GEO
Guernsey	GGY
Ghana	GHA
Gibraltar	GIB
Guinea	GIN
Gambia	GMB
Guinea Bissau	GNB
Equatorial Guinea	GNQ
Greece	GRC
Grenada	GRD
Greenland	GRL
Guatemala	GTM
Guam	GUM
Guyana	GUY
Hong Kong	HKG
Honduras	HND
Croatia	HRV
Haiti	HTI
Hungary	HUN
Indonesia	IDN
Isle of Man	IMN
India	IND
Ireland	IRL
Iran	IRN
Iraq	IRQ
Iceland	ISL
Israel	ISR

Italy	ITA
Jamaica	JAM
Jersey	JEY
Jordan	JOR
Japan	JPN
Kazakhstan	KAZ
Kenya	KEN
Kyrgyz Republic	KGZ
Cambodia	KHM
Kiribati	KIR
Saint Kitts and Nevis	KNA
South Korea	KOR
Kosovo	KOS
Kuwait	KWT
Laos	LAO
Lebanon	LBN
Liberia	LBR
Libya	LBY
Saint Lucia	LCA
Liechtenstein	LIE
Sri Lanka	LKA
Lesotho	LSO
Lithuania	LTU
Luxembourg	LUX
Latvia	LVA
Macao	MAC
Morocco	MAR
Monaco	MCO
Moldova	MDA
Madagascar	MDG
Maldives	MDV
Mexico	MEX
North Macedonia	MKD
Mali	MLI
Malta	MLT
Myanmar	MMR
Montenegro	MNE
Mongolia	MNG
Northern Mariana Islands	MNP
Mozambique	MOZ
Mauritania	MRT
Montserrat	MSR
Mauritius	MUS
Malawi	MWI
Malaysia	MYS

Mayotte	MYT
Namibia	NAM
New Caledonia	NCL
Niger	NER
Nigeria	NGA
Nicaragua	NIC
Netherlands	NLD
Norway	NOR
Nepal	NPL
Nauru	NRU
New Zealand	NZL
Oman	OMN
Pakistan	PAK
Panama	PAN
Pitcairn	PCN
Peru	PER
Philippines	PHL
Papua New Guinea	PNG
Poland	POL
Puerto Rico	PRI
Portugal	PRT
Paraguay	PRY
Palestine	PSE
French Polynesia	PYF
Qatar	QAT
Romania	ROU
Russia	RUS
Rwanda	RWA
Saudi Arabia	SAU
Sudan	SDN
Senegal	SEN
Singapore	SGP
Solomon Islands	SLB
Sierra Leone	SLE
El Salvador	SLV
San Marino	SMR
Somalia	SOM
Serbia	SRB
South Sudan	SSD
São Tome and Principe	STP
Suriname	SUR
Slovak Republic	SVK
Slovenia	SVN
Sweden	SWE
Eswatini	SWZ

Sint Maarten	SXM
Seychelles	SYC
Syria	SYR
Turks and Caicos Islands	TCA
Chad	TCD
Togo	TGO
Thailand	THA
Tajikistan	TJK
Turkmenistan	TKM
East Timor	TLS
Trinidad and Tobago	TTO
Tunisia	TUN
Turkey	TUR
Tuvalu	TUV
Taiwan	TWN
Tanzania	TZA
Uganda	UGA
Ukraine	UKR
Uruguay	URY
United States	USA
Uzbekistan	UZB
Vatican City	VAT
Saint Vincent and the Grenadines	VCT
Venezuela	VEN
British Virgin Islands	VGB
United States Virgin Islands	VIR
Vietnam	VNM
Vanuatu	VUT
Wallis and Fortuna	WLF
Yemen	YEM
South Africa	ZAF
Zambia	ZMB
Zimbabwe	ZWE

Appendix C. List of Countries in the IMF Emerging Markets and Developing Economies.

Country	**Country Code**
Afghanistan	AFG
Albania	ALB
Algeria	DZA
Angola	AGO
Antigua and Barbuda	ATG
Argentina	ARG
Armenia	ARM
Aruba	ABW

Azerbaijan	AZE
Bahamas	BHS
Bahrain	BHR
Bangladesh	BGD
Barbados	BRB
Belarus	BLR
Belize	BLZ
Benin	BEN
Bhutan	BTN
Bolivia	BOL
Bosnia and Herzegovina	BIH
Botswana	BWA
Brazil	BRA
Brunei	BRN
Bulgaria	BGR
Burkina Faso	BFA
Burundi	BDI
Cambodia	KHM
Cameroon	CMR
Cape Verde	CPV
Central African Republic	CAF
Chad	TCD
Chile	CHL
China	CHN
Colombia	COL
Comoros	COM
Congo	COG
Costa Rica	CRI
Cote d'Ivoire	CIV
Croatia	HRV
Democratic Republic of Congo	COD
Djibouti	DJI
Dominica	DMA
Dominican Republic	DOM
East Timor	TLS
Ecuador	ECU
Egypt	EGY
El Salvador	SLV
Equatorial Guinea	GNQ
Eritrea	ERI
Eswatini	SWZ
Ethiopia	ETH
Fiji	FJI
Gabon	GAB
Gambia	GMB

Georgia	GEO
Ghana	GHA
Grenada	GRD
Guatemala	GTM
Guinea	GIN
Guinea Bissau	GNB
Guyana	GUY
Haiti	HTI
Honduras	HND
Hungary	HUN
India	IND
Indonesia	IDN
Iran	IRN
Iraq	IRQ
Jamaica	JAM
Jordan	JOR
Kazakhstan	KAZ
Kenya	KEN
Kosovo	KOS
Kuwait	KWT
Kyrgyz Republic	KGZ
Laos	LAO
Lebanon	LBN
Lesotho	LSO
Liberia	LBR
Libya	LBY
Madagascar	MDG
Malawi	MWI
Malaysia	MYS
Maldives	MDV
Mali	MLI
Mauritania	MRT
Mauritius	MUS
Mexico	MEX
Moldova	MDA
Mongolia	MNG
Montenegro	MNE
Morocco	MAR
Mozambique	MOZ
Myanmar	MMR
Namibia	NAM
Nepal	NPL
Nicaragua	NIC
Niger	NER
Nigeria	NGA

North Macedonia	MKD
Oman	OMN
Pakistan	PAK
Panama	PAN
Papua New Guinea	PNG
Paraguay	PRY
Peru	PER
Philippines	PHL
Poland	POL
Qatar	QAT
Romania	ROU
Russia	RUS
Rwanda	RWA
Saint Kitts and Nevis	KNA
Saint Lucia	LCA
Saint Vincent and the Grenadines	VCT
São Tome and Principe	STP
Saudi Arabia	SAU
Senegal	SEN
Serbia	SRB
Seychelles	SYC
Sierra Leone	SLE
Solomon Islands	SLB
Somalia	SOM
South Africa	ZAF
South Sudan	SSD
Sri Lanka	LKA
Sudan	SDN
Suriname	SUR
Syria	SYR
Tajikistan	TJK
Tanzania	TZA
Togo	TGO
Trinidad and Tobago	TTO
Tunisia	TUN
Turkey	TUR
Turkmenistan	TKM
Uganda	UGA
Ukraine	UKR
United Arab Emirates	ARE
Uruguay	URY
Uzbekistan	UZB
Vanuatu	VUT
Venezuela	VEN
Vietnam	VNM

Yemen	YEM
Zambia	ZMB
Zimbabwe	ZWE

Appendix D. The 20 countries with the higher total number of COVID-19 Cases from the 1st of January 2020 until the 27th of October 2020.

Country	Total Cases
United States	8 704 524
India	7 946 429
Brazil	5 409 854
Russia	1 531 224
France	1 165 278
Spain	1 116 738
Argentina	1 102 288
Colombia	1 025 052
Mexico	895 326
United Kingdom	894 690
Peru	890 574
South Africa	716 759
Iran	574 856
Italy	542 789
Chile	503 598
Iraq	455 398
Germany	449 275
Bangladesh	400 251
Indonesia	392 934

Appendix E. The 20 countries with the higher total number of COVID-19 Deaths from the 1st of January 2020 until the 27th of October 2020.

Country	Total Deaths
United States	225 735
Brazil	157 397
India	119 502
Mexico	89 171
United Kingdom	44 998
Italy	37 479
Spain	35 298
France	35 018
Peru	34 197
Iran	32 953
Colombia	30 348
Argentina	29 301
Russia	26 269

South Africa	19 008
Chile	14 003
Indonesia	13 411
Ecuador	12 573
Belgium	11 059
Iraq	10 671

Appendix F. The 20 countries with the higher total disbursement of Development funding per capita between 2009 and 2018.

Country	Total Development Funding from 2009 to 2018 (Millions USD)	
China	$	376 100,78
Brazil	$	323 441,91
Mexico	$	208 796,75
India	$	190 775,98
Turkey	$	146 279,06
Indonesia	$	102 512,74
Vietnam	$	85 041,28
Egypt	$	71 699,02
Thailand	$	53 259,29
Afghanistan	$	52 390,77
Nigeria	$	52 367,48
Malaysia	$	52 346,24
South Africa	$	47 189,43
Colombia	$	46 731,66
Syria	$	44 817,13
Ethiopia	$	42 091,87
Morocco	$	40 095,45
Argentina	$	39 616,20
Philippines	$	37 562,80
Iraq	$	33 250,85

Appendix G. The 20 countries with the higher total disbursement of Health specific funding per capita between 2009 and 2010.

Country	Total Health Funding from 2009 to 2010 (Millions USD)	
Nigeria	$	1 658,99
India	$	1 546,27
Tanzania	$	1 292,15
Ethiopia	$	1 264,10
Kenya	$	1 200,08
South Africa	$	1 196,81

Uganda	$	884,20
Mozambique	$	865,64
Democratic Republic of Congo	$	774,11
Pakistan	$	751,15
Afghanistan	$	645,68
Zambia	$	611,67
Rwanda	$	564,97
Bangladesh	$	555,62
Vietnam	$	505,00
China	$	504,05
Malawi	$	495,16
Ghana	$	472,17
Indonesia	$	440,06
Zimbabwe	$	383,84